



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,646	11/13/2001	Xiaofeng Han	980.1076US01	4858
38846	7590	10/28/2004	EXAMINER	
CARLSON, CASPERS, VANDENBURGH & LINDQUIST 225 SO. 6TH STREET SUITE 3200 MPIS, MN 55402			LEE, HWA S	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/010,646

Applicant(s)

HAN ET AL.

Examiner

Andrew Hwa S. Lee

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 April 0819.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 18-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 18-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

Art Unit: 2877

## **DETAILED ACTION**

### ***Remarks***

This office action is in response to the applicant's amendment of 8/19/04.

By the amendment, claims 1-14 and 18-36 are now pending. Claims 1, 19, 20 and 22 have been amended, Claims 15-17 have been canceled. New claims 35 and 36 have been added.

### ***Allowable Subject Matter***

The indicated allowability of claim 16 is withdrawn in view of the misinterpretation by the examiner. The examiner deeply apologizes for the misinterpretation of claim 16.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 1-11, and 18-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 6,459,487).

Chen et al (Chen hereinafter) shows a system and method for fabricating components of precise optical path length comprising:

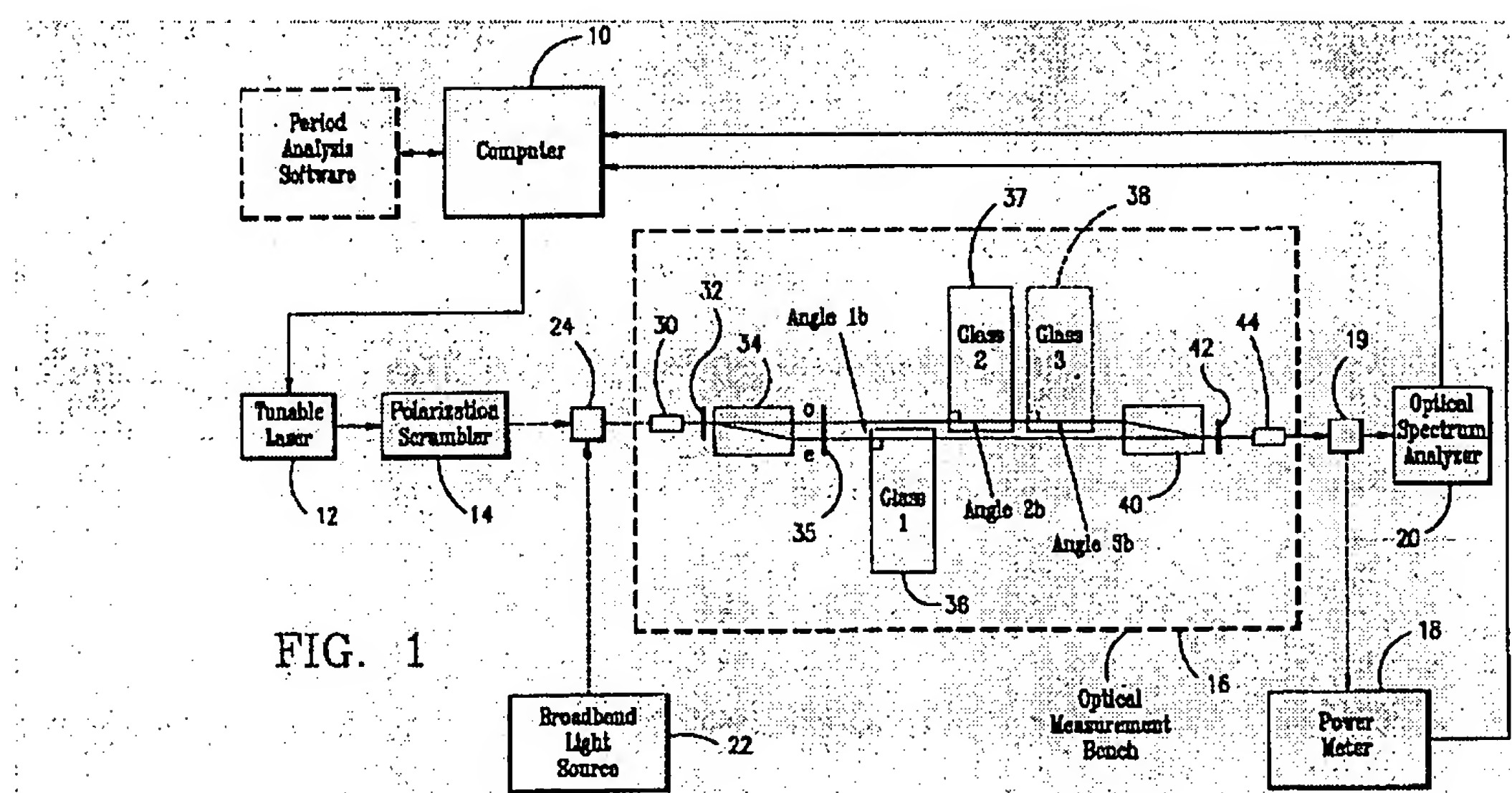
Art Unit: 2877

a first birefringent element (34) oriented to split the polarized input light beam into a first polarized beam and a second polarized beam having a polarization direction different to a polarization direction of the first beam;

a second birefringent element (40) oriented to combine the first and second polarized beams into an output beam; and

a polarization sensitive detection unit (42, 44, 18, and 20) disposed to detect a selected polarization of the output beam.

wherein the first birefringent element is oriented to receive the polarized input light beam along a z-direction, a y-direction is defined perpendicular to the z-direction and at 45 degrees to the polarization direction of the polarized input light, an x direction is defined orthogonal to both the y-direction and the z-direction and the first birefringent element has an optical axis lying at a selected angle  $\Theta$  relative to the z-direction in the y-z plane defined by the y-direction and the z-direction, the second birefringent element having an optical axis lying at the negative of the selected angle  $-\Theta$  relative to the z-direction in the y-z plane defined by the y-direction and the z-direction.



Chen does not expressly say that the first and second polarized beams have a polarization direction that is orthogonal to each other.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to have the polarization direction of the first beam orthogonal to the polarization direction of the second beam. Chen teaches that one beam is e polarized and the other beam is o polarized and that a  $\frac{1}{2}$  waveplate is used to rotate the polarization of one of the beams by 90 degrees in order combine the beams thus suggesting to one of ordinary skill in the art to have the e polarization orthogonal to the o polarization. Please see column 6, lines 6-13.

As for **claim 2**, Chen shows a light source (12 and 22) disposed to transmit the polarized input light beam to the first birefringent element.

As for **claim 3**, Chen shows that the light source (12) is a laser thus inherently producing a polarized beam and furthermore, Chen uses a polarization descrambler (30) to scramble the polarized beam and then uses a polarizer (32) to polarize the depolarized beam, thus suggesting to one of ordinary skill in the art that the descrambling the polarizing cleans the polarization of the beam.

As for **claim 4**, Chen shows the light source (22) includes a light generator that generates an unpolarized output, the unpolarized output passing through a polarizer (32) to produce the polarized input light beam.

As for **claim 5**, Chen shows a broadband light source (22).

As for **claim 6**, Chen shows a laser (12).

As for **claim 7**, Chen shows a tunable laser (12).

As for **claim 8**, Chen shows a controller (computer 10) coupled to control operation of the at least one of the light source and the detector unit.

As for **claim 9**, Chen shows that the computer has an analyzer unit coupled to the detector unit to record an output from the detector unit (column 6, lines 37-41 and column 7, lines 6-18).

As for **claim 10**, Chen shows an interface unit connected to the controller and couplable to a computer (column 5, lines 48+).

As for **claim 11**, Chen shows a polarizer (42) to select the selected polarization of the output beam from the second birefringent element.

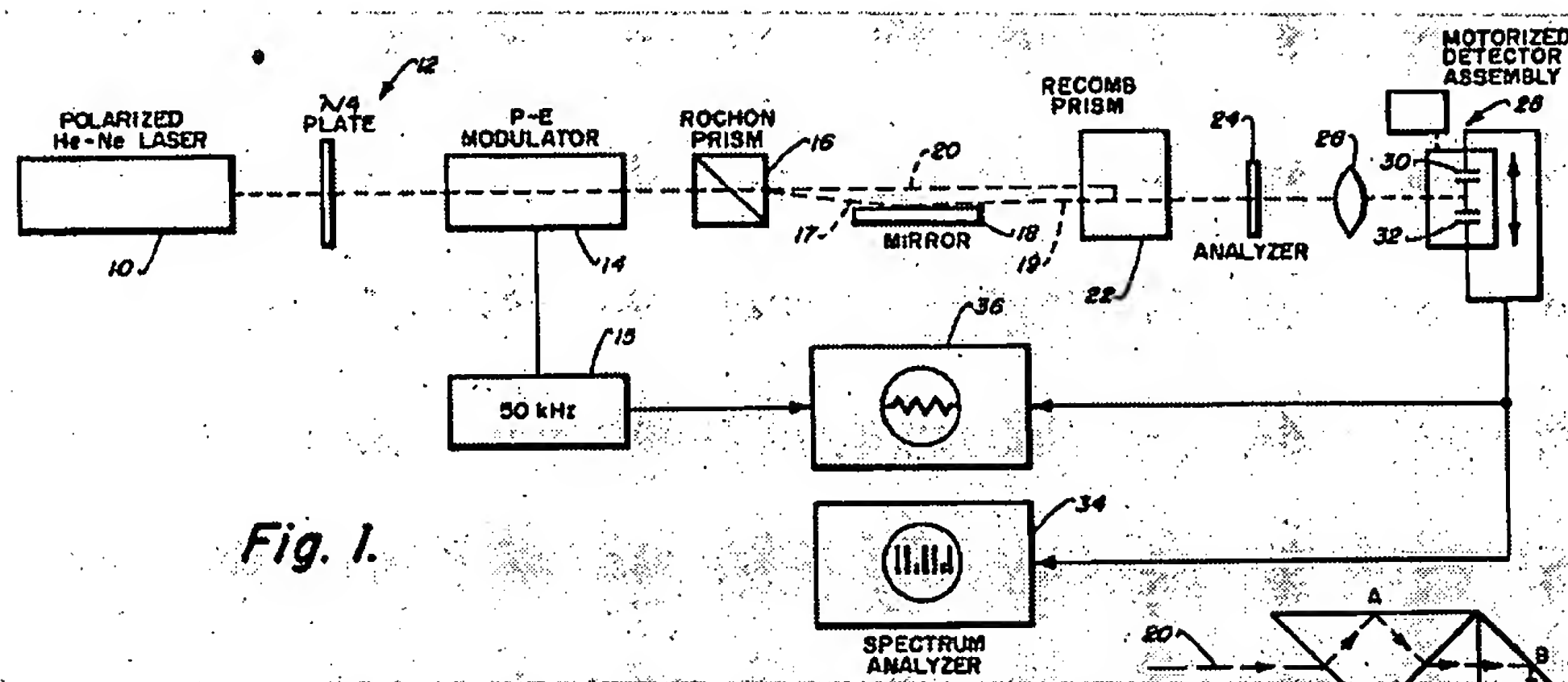
As for **claim 18**, Chen shows the first and second polarized beams are spatially separated by the first birefringent element so that the first polarized beam does not overlap the second polarized beam between the first and second birefringent elements (please see figure 1).

As for **claim 19**, Chen shows the first and second birefringent elements are separated along a direction parallel to a propagation direction of the first and second beams so as to leave a gap between the first and second birefringent elements (please see figure 1).

1. **Claims 20-24, 27, 35 and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bareket et al (US 4,480,916) in view of Murayama et al (US 4,165,937).

With regards to claims 20, 22, 35, and 36, Bareket et al ("Bareket" hereinafter) show a phase-modulated polarizing interferometer comprising:





polarization beam splitting means (16) for splitting an incoming polarized light beam into first and second light beams of orthogonal polarization;

polarization beam combining means (22) for combining the first and second light beams of orthogonal polarization into an output beam, polarization states of the first and second light beams being maintained between the polarization beam splitting means and the polarization combining means;

polarization sensitive detection means (24, 28) for detecting polarization of the output beam; and

wavelength selection means (34) for selecting a wavelength of light detected by the polarization sensitive detection means.

Bareket does not expressly show that the polarization splitting and combining means are birefringent.

Murayama et al (Murayama hereinafter) show a magneto-optic spectrophotometer comprising a birefringent element wherein Murayama teaches that a Rochon prism functions as a birefringent element. Furthermore, one of ordinary skill in the art would recognize that the recomb prism (22) also functions as a birefringent element.

With regards to **claims 21, 23, and 24**, please see polarized laser (10).

Art Unit: 2877

With regards to **claim 27**, Bareket shows a photodetector (30, 32) and a polarizer (24).

2. **Claims 25 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bareket and Murayama as applied to claim 27 above, and further in view of Chen (cited in previous office action).

Bareket and Murayama do now show the use of a tunable light source. Chen shows a tunable light source. At the time of the invention, one of ordinary skill in the art would have used a tunable light source in order to maintain the desired frequency of the light source so that the measurements are performed accurately with a known frequency in the event of frequency drift of the laser. Furthermore, Bareket shows that the resolution of the system is dependent on the frequency of the light source (column 3, lines 47-68) and therefore one of ordinary skill in the art would be motivated to have the flexibility of a light source with various frequencies.

3. **Claims 28-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bareket and Murayama as applied to claim 27 above, and further in view of Brooks (cited in previous office action).

Although Bareket shows the detectors moving, Bareket and Murayama do not expressly show various arrangement or elements of a spectrum analyzer including a moving light dispersing unit.

Brooks shows an optical spectrum analyzer comprising a photodetector (38) and a movable light dispersing unit (28) disposed before the photodetector.



Art Unit: 2877

At the time of the invention, one of ordinary skill in the art would have used a spectrometer having a photodetector in order to obtain quality measurement over a broad range since Brooks teaches that his spectrometer has a broad range while maintaining high resolution.

As for **claims 29 and 30**, Brooks does not expressly show a controller coupled to the movable dispersing element. However, Brooks teaches that the dispersive element can be rotated as desired therefore, it would have been obvious to one of ordinary skill in the art to automate the rotating with a controller and a computer.

As for **claim 31**, Brooks shows a CCD detector (38) which is a multiple channel photodetector disposed to detect multiple wavelengths of light dispersed by the light dispersing unit.

As for **claim 32**, Brooks shows a data analysis unit (10) coupled to the polarization sensitive detector to analyze an output signal from the polarization sensitive detector.

As for **claim 33**, Brooks shows a computer (10), but does not expressly show a display unit. At the time of the invention, one of ordinary skill in the art would have used a computer with a display unit in order for the operator to observe the measurement data. Official Notice is taken that display units (monitors) are old and well known in the art. See *In Re Malcolm* 1942 C.D.589: 543 O.G.440.

As for **claim 34**, Brooks shows that data analysis is performed by the computer.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-14 and 18-36 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2877

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa S. Lee whose telephone number is 571-272-2419. The examiner can normally be reached on Tue-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Andrew H. S. Lee  
Examiner  
Art Unit 2877